

## I. INTRODUCTION TO THE SECTOR NOTEBOOK PROJECT

### I.A. Summary of the Sector Notebook Project

Environmental policies based upon comprehensive analysis of air, water and land pollution (such as economic sector, and community-based approaches) are becoming an important supplement to traditional single-media approaches to environmental protection. Environmental regulatory agencies are beginning to embrace comprehensive, multi-statute solutions to facility permitting, compliance assurance, education/outreach, research, and regulatory development issues. The central concepts driving the new policy direction are that pollutant releases to each environmental medium (air, water and land) affect each other, and that environmental strategies must actively identify and address these interrelationships by designing policies for the "whole" facility. One way to achieve a whole facility focus is to design environmental policies addressing all media for similar industrial facilities. By doing so, environmental concerns that are common to the manufacturing of similar products can be addressed in a comprehensive manner. Recognition by the EPA Office of Compliance of the need to develop the industrial "sector-based" approach led to the creation of this document.

The Sector Notebook Project was initiated by the Office of Compliance within the Office of Enforcement and Compliance Assurance (OECA) to provide its staff and managers with summary information for eighteen specific industrial sectors. As other EPA offices, states, the regulated community, environmental groups, and the public became interested in this project, the scope of the original project was expanded. The ability to design comprehensive, common sense environmental protection measures for specific industries is dependent on knowledge of several interrelated topics. For the purposes of this project, the key elements chosen for inclusion are: general industry information (economic and geographic); a description of industrial processes; pollution outputs; pollution prevention opportunities; federal statutory and regulatory framework; compliance history; and a description of partnerships that have been formed between regulatory agencies, the regulated community and the public.

For any given industry, each topic listed above alone could be the subject of a lengthy volume. However, to produce a manageable document, this project focuses on providing summary information for each topic. This format provides the reader with a synopsis of each issue, and references where more in-depth information is available. Text within each profile was researched from a variety of sources, and was usually condensed from more detailed sources pertaining to specific topics. This approach allows for a wide coverage of activities that can be explored further based upon the references listed at the end of this profile. As a check on the information included, each notebook went through an external document review process. The Office of

Compliance appreciates the efforts of all those that participated in this process and enabled us to develop more complete, accurate and up-to-date summaries.

## **I.B. Additional Information**

### **Providing Comments**

OECA's Office of Compliance plans to periodically review and update notebooks and will make these updates available both in hard copy and electronically. If you have any comments on the existing notebook, or if you would like to provide additional information, please send a hard copy and computer disk to the EPA Office of Compliance, Sector Notebook Project, 401 M St., SW (2223-A), Washington, DC 20460. Comments can also be sent via the web page.

### **Adapting Notebooks to Particular Needs**

The scope of the industry sector described in this notebook approximates the relative national occurrence of facility types within the sector. In many instances, industries within specific geographic regions or states may have unique characteristics that are not fully captured in these profiles. For this reason, the Office of Compliance encourages state and local environmental agencies and other groups to supplement or re-package the information included in this notebook to include more specific industrial and regulatory information that may be available. Additionally, interested states may want to supplement the "Summary of Applicable Federal Statutes and Regulations" section with state and local requirements. Compliance or technical assistance providers also may want to develop the "Pollution Prevention" section in more detail. Please contact the appropriate specialist listed on the opening page of this notebook if your office is interested in assisting us in the further development of the information or policies addressed within this volume. If you are interested in assisting the development of new notebooks, please contact the Office of Compliance at 202-564-2310.

## II. INTRODUCTION TO THE AGRICULTURAL LIVESTOCK PRODUCTION INDUSTRY

This section provides background information on the agricultural livestock production industry. It presents the types of facilities described within this document and defines them in terms of their North American Industrial Classification System (NAICS) codes.

Establishments that produce livestock are classified in *NAICS code 112 (Animal Production)*. Data for the notebook, specifically in this chapter, were obtained from the U.S. Department of Agriculture (USDA) and the 1997 Agriculture Census (Ag Census). All data are the most recent publicly available data for the source cited.

The Office of Management and Budget (OMB) has replaced the Standard Industrial Classification (SIC) system, which was used to track the flow of goods and services within the economy, with the NAICS. The NAICS, which is based on similar production processes to the SIC system, is being implemented by OMB.

It should be noted that the data on the number of livestock establishments presented in the following sections do not represent the number of animal feeding operations (AFOs) or concentrated animal feeding operations (CAFOs) in the U.S. The data simply represent numbers of livestock establishments only. Additional information on AFOs and CAFOs is presented in Section II.C.

Establishments primarily engaged in livestock production are classified in subgroups up to six digits in length, based on the total value of sales of agricultural products. An establishment would be placed in the group that represents 50 percent or more of its total sales. For example, if 51 percent of the total sales of an establishment are from sales of beef cattle, that establishment would first be classified under NAICS code 1121 (Cattle Ranching and Farming), then 11211 (Beef cattle ranching and farming, including feedlots), and finally under 112111 (Beef cattle ranching and farming).

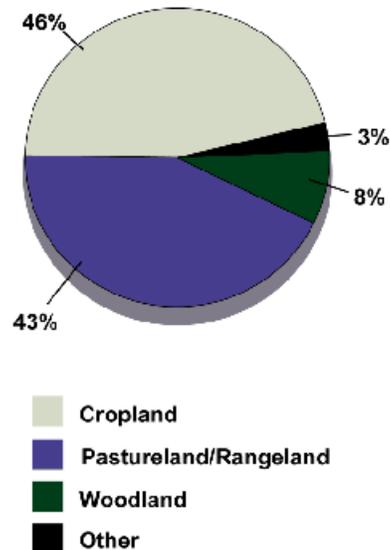
### II.A. General Overview of Agricultural Establishments

This section presents a general overview of all agricultural establishments to provide the reader with background information regarding the number and organization of such establishments and production data. The USDA's National Agricultural Statistics Service (NASS) defines an *agricultural establishment* (farm) based on production. It defines an agricultural establishment as a place which produced or sold, or normally would have produced or sold, \$1,000 or more of agricultural products during the year. Agricultural products include all products grown by establishments under NAICS codes 111 - Crop Production and 112 - Animal Production.

According to the 1997 Ag Census, there were more than 1.9 million farms (i.e., agricultural establishments) in the United States. Of these, approximately 53 percent (1,009,487 farms) were classified as NAICS code 112 - Animal Production. The other 47 percent (902,372 farms) were classified as NAICS code 111 - Crop Production. These 1.9 million agricultural establishments represent nearly 932 million acres of land, with the average agricultural establishment consisting of 487 acres. (Note: 1 acre is approximately the size of a football field.) Both of these numbers--932 million acres and 487 acres--are smaller than those for 1992, which were 946 million acres and 491 acres, respectively.

As shown in Exhibit 1, of the 932 million acres of agricultural land, the overwhelming majority (89%) consists of cropland and pastureland/rangeland.

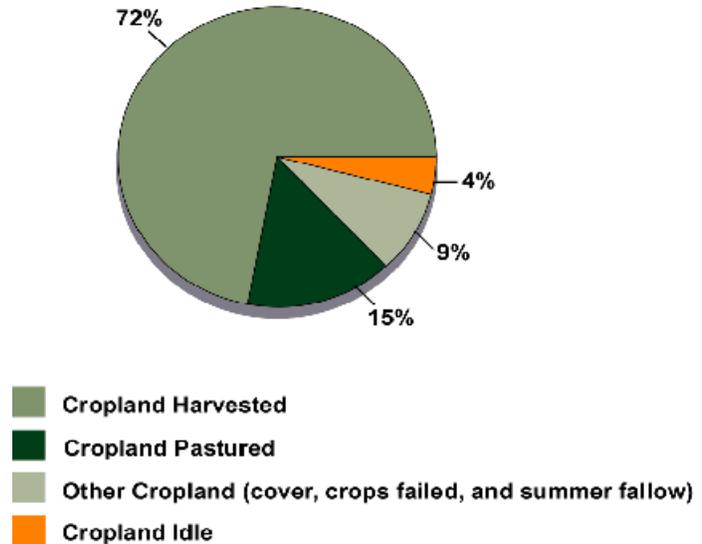
**Exhibit 1. Agricultural Land Use in the U.S. (1997 Ag Census)**



As presented in Exhibit 2, the 1997 Ag Census describes cropland as:

**Exhibit 2. Types of Cropland  
(1997 Ag Census)**

- *Harvested cropland* -- Includes all acreage from which crops are harvested, such as: (1) corn, wheat, barley, oats, sorghum, soybeans, cotton, and tobacco; (2) wild or tame harvested hay, silage, and green chop; and (3) vegetables. It also includes land in orchards and vineyards; all acres in greenhouses, nurseries, Christmas trees, and sod; and any other acreage from which a crop is harvested even if the crop is considered a partial failure and the yield is very low.



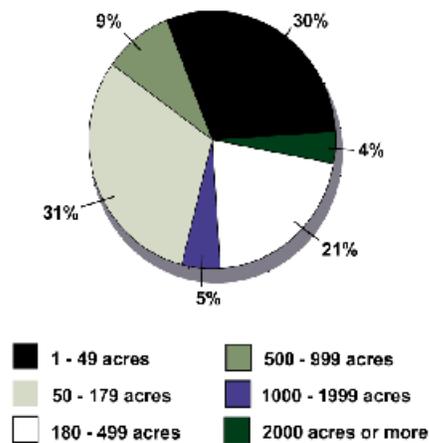
- *Cropland used only for pasture or grazing* -- Includes land pastured or grazed which could be used for crops without any additional improvement, and land in planted crops that is pastured or grazed before reaching maturity.
- *Cropland used for cover crops* -- Includes land used only to grow cover crops for controlling erosion or to be plowed under for improving the soil.
- *Cropland on which all crops failed* -- Includes: (1) all land from which a crop failed (except fruit or nuts in an orchard, grove, or vineyard being maintained for production) and no other crop is harvested and which is not pastured or grazed, and (2) acreage not harvested due to low prices or labor shortages.
- *Cultivated summer fallow* -- Includes cropland left unseeded for harvest, and cultivated or treated with herbicides to control weeds and conserve moisture.
- *Idle cropland* -- Includes any other acreage which could be used for crops without any additional improvement and which is not included in one of the above categories of cropland.

The 1997 Ag Census describes pastureland and rangeland as land, other than cropland or woodland pasture, that is normally used for pasture or grazing. This land, sometimes called "meadow" or "prairie," may be composed of bunchgrass, shortgrass, buffalo grass, bluestem, bluegrass, switchgrass, desert shrubs, sagebrush, mesquite, greasewood, mountain browse, salt brush, cactus, juniper, and pinion. It also can be predominantly covered with brush or browse.

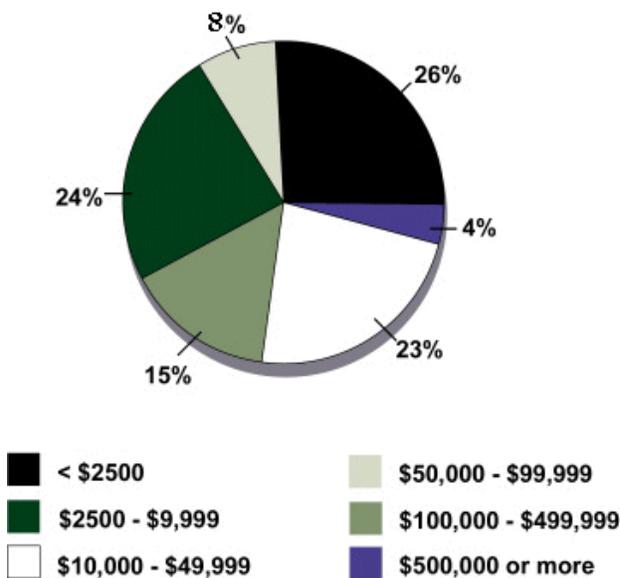
As presented in Exhibit 3, approximately 82 percent of agricultural establishments in 1997 consisted of fewer than 500 acres; only 4 percent consisted of 2,000 or more acres.

According to the 1997 Ag Census, all agricultural establishments combined to produce approximately \$197 billion worth of agricultural products.

**Exhibit 3. Acreage of Agricultural Establishments in the U.S. (1997 Ag Census)**



**Exhibit 4. Agricultural Establishments by Value of Sales (1997 Ag Census)**



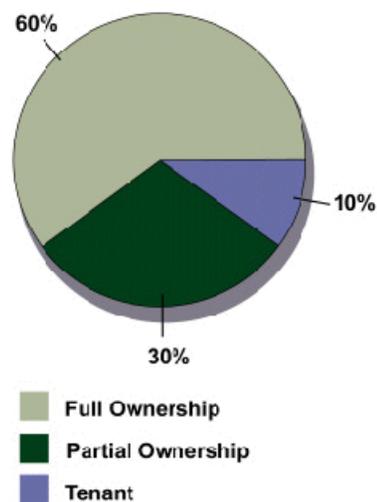
The market value of the agricultural products sold was split almost evenly between crop production, including nursery and greenhouse crops (49.6%) and livestock production (50.4%).

As shown in Exhibit 4, approximately 73 percent of all agricultural establishments produced less than \$50,000 worth of agricultural products.

In addition to tracking the number of agricultural establishments and the value of products sold, the Ag Census tracks and identifies other characteristics of agricultural establishments, such as ownership and organization. Exhibit 5 presents a breakdown of the ownership status of agricultural establishments in the U.S. The Ag Census basically identifies the ownership status of agricultural establishments by one of three categories:

- Full ownership, in which full owners operate only the land they own.
- Partial ownership, in which partial owners operate land they own and also land they rent from others.
- Tenant/rental arrangement, in which tenants operate only land they rent from others or work on shares for others.

**Exhibit 5. Ownership Status of Agricultural Establishments in the U.S.**  
(1997 Ag Census)



The Census further classifies agricultural establishment ownership by the person or entity who owns the establishment. There are four distinct types of organization: (1) individual or family (sole proprietorship), (2) partnership, including family partnership, (3) corporation, including family corporation, and (4) other, including cooperatives, estate or trust, and institutional. Approximately 86 percent of all establishments are owned and operated by individuals or families. Partnerships account for another 9 percent of the establishments and corporations own just more than 4 percent of the establishments. Fewer than 1 percent of all farms are owned by other organizations (1997 Ag Census).

## II.B. Characterization of the Livestock Production Industry

This section provides data and information on the livestock production industry. For the purposes of this profile, livestock production includes the six categories of livestock presented in Exhibit 6. It should be noted that this profile does not include the processing of agricultural livestock products (e.g., meat processing plants, milk processing, etc.), and only discusses livestock production to the point of sending the livestock to the processing point (e.g., beyond the feedlot).

This notebook follows the structure provided by the 1997 Ag Census, which classifies all of these livestock production operations within NAICS code 112.

**Exhibit 6. 1997 NAICS Descriptions for Animal Production (NAICS 112)**

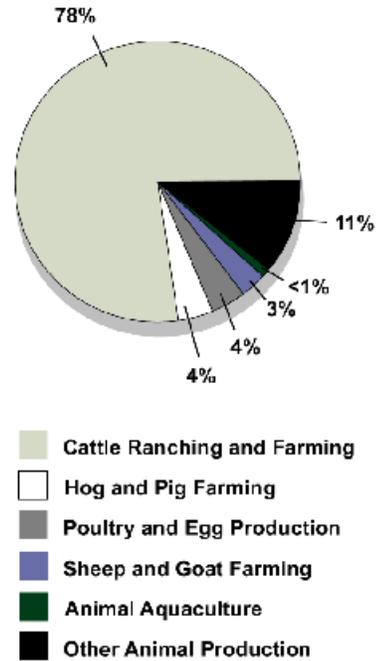
Type of Establishment	NAICS Code	SIC Code	
Cattle ranching and farming, dairy farming	1121	0211, 0212, 0241	Establishments primarily engaged in raising cattle, milking dairy cattle, or feeding cattle for fattening.
Hog and pig farming	1122	0213	Establishments primarily engaged in raising hogs and pigs. These establishments may include farming activities, such as breeding, farrowing, and the raising of weaning pigs, feeder pigs, or market size hogs.
Poultry and egg production	1123	0251, 0252, 0253, 0254, 0259	Establishments primarily engaged in breeding, hatching, and raising poultry for meat or egg production.
Sheep and goat farming	1124	0214	Establishments primarily engaged in raising sheep, lambs, and goats, or feeding lambs for fattening.
Animal aquaculture	1125	0273, 0279, 0919, 0921	Establishments primarily engaged in the farm raising of finfish, shellfish, or any other kind of animal aquaculture. These establishments use some form of intervention in the rearing process to enhance production, such as holding in captivity, regular stocking, feeding, and protecting from predators.
Other animal production	1129	0271, 0272, 0279	Establishments primarily engaged in raising animals and insects for sale or product production (except those listed above), including bees, horses and other equines, rabbits and other fur-bearing animals and associated products (e.g., honey). Also includes those establishments for which no one animal or animal family represents one-half of production.

According to the 1997 Ag Census, there were 1,009,487 establishments producing the six categories of livestock referenced above (see Exhibit 7). Of the 1,009,487 livestock producing establishments, approximately 78 percent were classified as cattle ranching and farming.

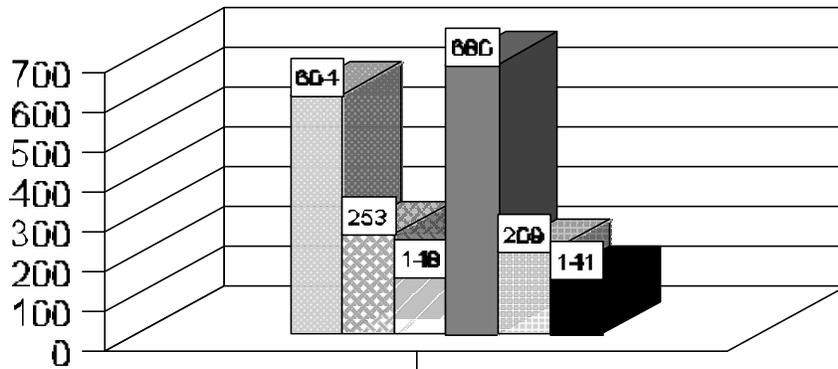
All livestock producing establishments combined covered nearly 530 million acres of land.

Based on the number of establishments and total acreage for each NAICS code, Exhibit 8 presents the average size of each type of establishment.

**Exhibit 7. Number of Livestock-Producing Establishments by NAICS Code (1997 Ag Census)**



**Exhibit 8. Average Establishment Size (1997 Ag Census)**



**Average Establishment Size (in acres)**



The six types of livestock producing establishments defined above accounted for approximately \$99 billion worth of products sold in 1997. Exhibit 9 presents the distribution of total sales among the six types of establishments compared to the total number of establishments. EPA's *Preliminary Data Summary Feedlots Point Source Category Study* released in January 1999 contains additional detailed information for beef cattle, dairy, pork, sheep, and poultry operations.

**Exhibit 9. Percentage of Establishments & Sales by Type  
(1997 Ag Census)**

Type of Livestock Establishment	Percent of Establishments	Percent of Sales
Cattle Ranching and Farming	78	60
Hog and Pig Farming	4	14
Poultry and Egg Production	4	23
Sheep and Goat Farming	3	<1
Animal Aquaculture	<1	<1
Other Animal Production	11	2

### II.B.1. Cattle Ranching and Farming

Cattle ranching and farming establishments (NAICS code 1121) comprise the overwhelming majority of all establishments categorized under NAICS code 112 by accounting for 77.9 percent of all livestock establishments. In the U.S. in 1997, there were 785,672 cattle ranching and farming establishments. Of these, approximately 89 percent (699,650 establishments) were categorized as beef cattle establishments, including feedlots. The remaining 11 percent (86,022 establishments) were categorized as dairy cattle and milk production facilities. In 1997, the average beef cattle establishment was nearly 635 acres in size. Establishments raising dairy cattle and producing milk averaged approximately 356 acres.

Cattle ranching and farming establishments accounted for approximately \$60 billion of sales in 1997. Of that \$60 billion, beef cattle establishments had sales of approximately \$38 billion (approximately 65 percent of sales), while dairy cattle and milk production accounted for the remaining \$21 billion. Exhibit 10 compares the percentage sales of each subcategory to the percentage of establishments.

**Exhibit 10. Percentage of Establishments & Sales  
in the Cattle Ranching and Farming Industry (1997 Ag Census)**

Type of Establishment	Percent of Establishments	Percent of Sales
Beef cattle ranch and farming, including feedlots	89	65
Dairy cattle and milk production	11	35

### **II.B.2. Hog and Pig Farming**

Hog and pig farming (NAICS code 1122) comprised approximately 4.6 percent (46,353 establishments) of all the livestock producing establishments in the U.S. in 1997. These establishments accounted for nearly \$14 billion in total sales, or approximately 14 percent of total livestock producing establishment sales in 1997.

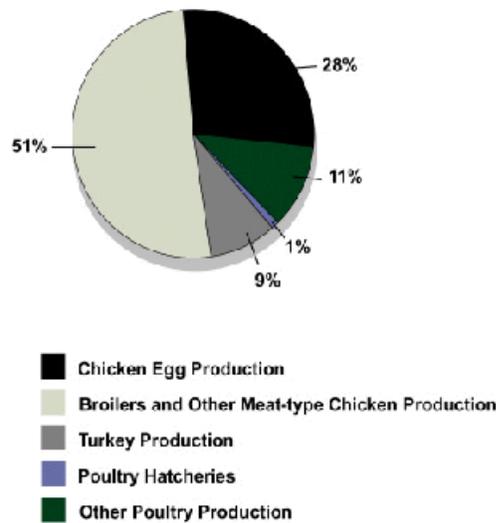
### **II.B.3. Poultry and Egg Production**

Poultry and egg production is classified in NAICS code 1123. In 1997, this category included 36,944 establishments, or approximately 4 percent of all livestock producing establishments in the U.S. Poultry and egg production is divided into 5 subclassifications:

- Chicken egg production (NAICS code 11231)
- Broilers and other meat-type chicken production (NAICS code 11232)
- Turkey production (NAICS code 11233)
- Poultry hatcheries (NAICS code 11234)
- Other poultry production, including ducks, emus, geese, ostrich, pheasant, quail, and ratite (NAICS code 11239)

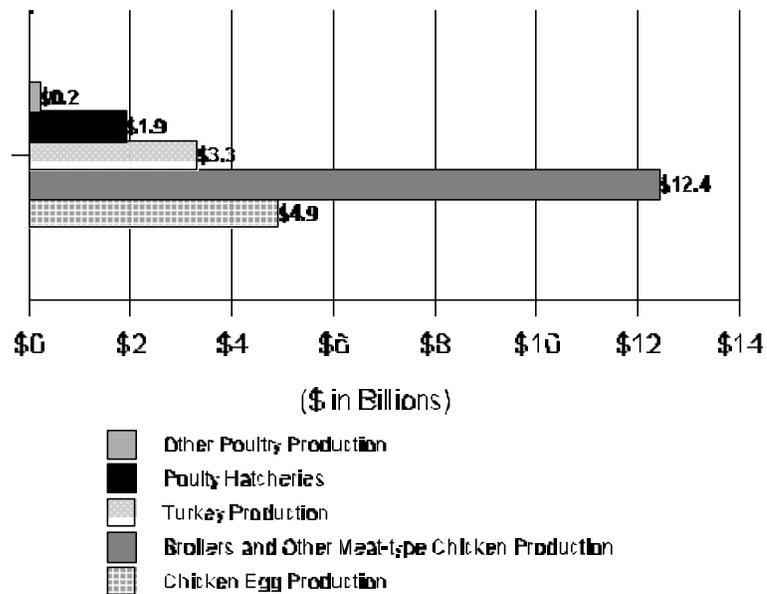
Exhibit 11 provides a breakdown of the 5 subclassifications by number of establishments. Each of these establishments averages approximately 150 acres in size.

**Exhibit 11. Percent of Poultry and Egg Production Establishments by Type (1997 Ag Census)**



In 1997, the poultry and egg production industry combined for nearly \$23 billion in sales, which accounted for 23 percent of total livestock sales in the U.S. Sales of broilers and other meat-type chicken accounted for 54 percent of those sales (approximately \$12.4 billion). Exhibit 12 presents the total sales of each of the subclassifications of the poultry and egg production industry.

**Exhibit 12. Total Sales of Poultry and Egg Production Establishments by Type (1997 Ag Census)**



The poultry industry has increased its use of contractual agreements because of the high number of producers relative to the number of available buyers willing to handle raw farm products. The use of contracts has been noted to affect the organizational structure of the poultry industry raising questions about ownership responsibility as well as environmental concerns. This is particularly true when animals are produced under contracts where the contractor (processor or integrator) dictates the terms of the contract and controls the amount produced and the production practices used, but the contractee (grower) retains responsibility for increased animal waste management and disease control often without adequate compensation to meet these additional costs. In a 1993 study, USDA showed that almost 90 percent of the value of all poultry production is produced under contract, which has played a key role in the influence of integrators on the poultry sector.

#### **II.B.4. Sheep and Goat Farming**

Sheep and goat farming (NAICS code 1124) comprised 3 percent of all livestock establishments in the U.S. in 1997 and accounted for nearly 4 percent of the total acreage of livestock establishments. Of the 29,938 sheep and goat establishments, 21,084 (approximately 70 percent) are sheep farms; the remaining 8,854 are goat farms. The average sheep farm is approximately 830 acres in size. Goat farms average approximately 320 acres.

In 1997, sheep and goat farms combined for \$625 million in total sales, which is less than 1 percent of total livestock producing establishment sales and the least amount of the six primary NAICS codes. Sheep accounted for \$568 million in sales (approximately 91 percent) and goat sales accounted for the remaining \$57 million.

#### **II.B.5. Animal Aquaculture**

Animal aquaculture (NAICS code 1125) is the smallest of the livestock producing establishments in terms of number of establishments, with only 3,079 active establishments in 1997. This accounted for fewer than 1 percent of all livestock producing establishments in the U.S. It also accounted for less than 1 percent (\$800 million) of the 1997 total sales of livestock producing establishments. NAICS subdivides animal aquaculture establishments as follows:

- Finfish farming and fish hatcheries (NAICS code 112511), which is raising finfish (e.g., catfish, trout, goldfish, tropical fish, salmon, and minnows) and/or hatching fish of any kind.
- Shellfish farming (NAICS code 112512), which is raising crayfish, shrimp, oysters, clams, and/or mollusks.

- Other animal aquaculture (NAICS code 112519), which is raising animals other than finfish and shellfish, including alligators, frogs, and/or turtles.

While data for each of the specific NAICS subclassifications were not available through the 1997 Ag Census, USDA's NASS has identified at least 955 catfish producing operations. These operations are located primarily in four states--Alabama, Arkansas, Louisiana, and Mississippi. Similarly, the USDA has identified 451 trout operations located in 16 states, but primarily in North Carolina, Wisconsin, and Michigan. These trout operations had total sales in 1998 of \$78.9 million. Both the number of operations and the value of total sales are down from the 1997 totals of 465 and \$79.8 million, respectively.

### **II.B.6. Other Animal Production**

Production of other animals (NAICS code 1129) occurred at 107,051 establishments in 1997, which is approximately 11 percent of all livestock producing establishments in the U.S. These establishments produce a variety of other animals including:

- Apiculture [bee farming (i.e., raising bees)] (NAICS code 11291)
- Horse and other equine production, including burros, donkeys, mules, and ponies (NAICS code 11292)
- Fur-bearing animal and rabbit production, including chinchillas, foxes, and mink (NAICS code 11293)
- All other animal production, including aviaries, bison/buffalo, cats/dogs, llamas, snakes, and worms (NAICS code 11299)

These four subclassifications accounted for just more than 2 percent of the total sales of livestock producing establishments in 1997. Exhibit 13 provides a breakdown of the 4 subclassifications by percent of establishments, as well as by percent of sales.

**Exhibit 13. Percent of Establishments & Sales for the  
Other Animal Production Industry (1997 Ag Census)**

<b>Establishment Type</b>	<b>Percent of Establishments</b>	<b>Percent of Sales</b>
Apiculture	4	5.9
Horse and Other Equine Production	86	42.9
Fur-bearing Animal and Rabbit Production	1	4.7
All Other Animal Production	9	46.5

### **II.C. Animal Feeding Operations**

Many livestock establishments within NAICS code 112 are defined by EPA as either animal feeding operations (AFOs) or concentrated animal feeding operations (CAFOs). The primary factor classifying a livestock operation as an AFO or CAFO is the confinement of animals in a relatively small area devoid of sustaining vegetation. According to the USDA/EPA Unified National Strategy for AFOs, "AFOs congregate animals, feed, manure and urine, dead animals, and production operations on a small area of land." This factor separates AFOs (and CAFOs) from the pasture and range operations. The number of animals, among other factors, separates the AFOs from the CAFOs.

EPA is currently collecting and analyzing data on livestock production facilities to determine the number of facilities which meet the definition of AFO or CAFO. This will allow the Agency to better understand the universe of the regulated community, assist compliance, and as necessary, take enforcement action. EPA is currently developing AFO guidance documents and revised regulations that address permitting, performance standards, and other issues. The following sections provide information on the regulatory definitions of both AFOs and CAFOs.

#### **Animal Feeding Operations**

##### ***What is an AFO?***

The term animal feeding operation or AFO is defined in EPA regulations [40 CFR 122.23(b)(1)] as:

- A lot or facility where animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period; AND

- Where crops, vegetation, forage growth, or post-harvest residues are not sustained over any portion of the lot or facility in the normal growing season.

According to EPA<sup>1</sup>, the first part of this regulatory definition of an AFO states that animals must be kept on the lot or facility for a minimum of 45 days. If an animal is at a facility for any portion of a day, it is considered to be at the facility for a full day. However, this does not mean that the same animals must remain on the lot for 45 days; only that some animals are fed or maintained on the lot or facility 45 days out of any 12-month period. The 45 days do not have to be consecutive, and the 12-month period does not have to correspond to the calendar year. For example, June 1 to the following May 31 would constitute a 12-month period.

The second part of the regulatory definition of an AFO is meant to distinguish facilities that have feedlots (concentrated confinement areas) from those which have pasture and grazing land, which are generally not AFOs. Facilities that have feedlots with constructed floors, such as solid concrete or metal slots, satisfy this part of the definition. If a facility maintains animals in an area without vegetation, including dirt lots, the facility meets this part of the definition. Dirt lots with nominal vegetative growth along the edges while animals are present or during months when animals are kept elsewhere are also considered by EPA to meet the second part of the definition.

The NPDES permit regulations [40 CFR Part 122.23(b)(1)] give the permitting authority (EPA or NPDES-authorized States) considerable discretion in applying the AFO definition. EPA defines the AFO to include the confinement area and the storage and handling areas necessary to support the operation (e.g., waste storage areas). Grazing and winter feeding of animals in a confined area on pasture or range land are not normally considered to meet the AFO definition.

As indicated in the USDA/EPA Unified National Strategy for AFOs, discharges from areas where manure and wastewater are applied to the land can have a significant impact on water quality. These land application areas are outside the area of confined animals but can be implicated by their direct relationship to AFO waste. Discharges of CAFO wastes from land application areas can qualify as point source discharges in certain circumstances. Accordingly, NPDES permits for CAFOs should address land application of wastes from CAFOs.

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<sup>1</sup> *Guidance Manual and Example NPDES Permit for Concentrated Animal Feeding Operations (Draft)*, U.S. Environmental Protection Agency, August 6, 1999.

***How Do You Determine the Size of an AFO?***

Once the facility meets the AFO definition, its size, based upon the total numbers of animals confined, is a fundamental factor in determining whether it is a CAFO. The animal livestock industry is diverse and includes a number of different types of animals that are kept and raised in confined situations. In order to define these various livestock sectors in relative terms, the concept of an “animal unit”<sup>2</sup> was established in the EPA regulations [40 CFR Part 122 Appendix B]. An animal unit (AU) varies according to animal type; one animal is not necessarily equal to one AU. Each livestock type, except poultry, is assigned a multiplication factor to facilitate determining the total number of AUs at a given facility. Multiplication factors are defined in Exhibit 14.

<b>Exhibit 14. Multiplication Factors to Calculate Animal Units</b>	
<b>Animal Type</b>	<b>Multiplication Factor</b>
Beef Cattle (slaughter and feeder)	1.0
Mature Dairy Cattle	1.4
Swine (weighing more than 55 lbs.)	0.4
Sheep	0.1
Horses	2.0
Poultry	There are currently no animal unit conversions for poultry operations. However the regulations [40 CFR 122, Appendix B] define the total number of animals (subject to waste handling technology restrictions) for specific poultry types that make these operations subject to the regulation.

These factors also are used when determining the total number of animal units at a facility with multiple animal types. Multiplication factors are applied to the total for each type of animal to determine the AU for that animal type. The AUs for each are then totaled for the facility total. A hypothetical AFO with multiple animal types and the calculation to determine the total number of animals confined at the facility is presented below (see box).

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<sup>2</sup> EPA and USDA both use the concept of “animal unit,” however it is important to recognize that with respect to swine and poultry, there are Agency differences in the application of this concept.

**Example: Animal Unit Determination for an AFO with Multiple Animal Types**

**Situation:** An AFO is being evaluated to determine if it meets the animal unit criteria for being defined as a CAFO and subject to NPDES permitting. The facility confines 200 horses, 300 sheep, and 500 beef cattle.

<b>Animal Unit Calculation:</b>	200 Horses x 2.0 =	400 AUs
	300 Sheep x 0.1 =	30 AUs
	500 Beef Cattle x 1.0 =	500 AUs
	Total	930 AUs

Under the regulations, two or more AFOs under common ownership are considered one operation if they adjoin each other or use a common waste disposal system [40 CFR 122.23(b)(2)]. For example, facilities have a common waste disposal system if the wastes are commingled (e.g., stored in the same pond or lagoon or land applied on commonly owned fields) prior to use or disposal. The collective number of animal units of the adjoining facilities is used in determining the size of the AFO. Many poultry feeding operations adjoin each other and often meet the definition of one facility.

**Concentrated Animal Feeding Operations**

AFOs are CAFOs if they meet the regulatory definition [40 CFR 122, Appendix B] or have been designated on a case-by-case basis [40 CFR 122.23 (c)] by the NPDES-authorized permitting authority.

***AFOs Defined as CAFOs***

According to the NPDES regulations, a specific definition must be used when determining whether an AFO is a CAFO. The definition is broken down according to the number of animals confined at the facility (see box). AFOs with more than 1,000 AUs are CAFOs. AFOs with 301 to 1,000

**AFOs are Defined as CAFOs if:**

- More than 1,000 AUs are confined at the facility [40 CFR 122, Appendix B (a)]; *or*
- From 301 to 1,000 AUs are confined at the facility and:
  - S** Pollutants are discharged into waters of the U.S. through a man-made ditch, flushing system, or other similar man-made device; or
  - S** Pollutants are discharged directly into waters of the U.S. that originate outside of and pass over, across, or through the facility or come into direct contact with the confined animals.

AUs are defined as CAFOs only if, in addition to the number of animals confined, they also meet one of the specific criteria addressing the method of discharge (see text box).

AFOs with fewer than 300 AUs are not defined as CAFOs under the current regulations but may be designated as a CAFO.

- ***AFOs With More Than 1,000 AUs are CAFOs.*** Under existing regulations, virtually all AFOs with more than 1,000 AUs are CAFOs and should apply for an NPDES permit. For individual animal types, the regulations state the number of animals required for the facility to be defined as a CAFO. These numbers are presented in Exhibit 15. If the number of AUs for any one animal type at a facility exceeds the corresponding number, or if the cumulative number of animal types exceeds 1,000 AUs, the facility is defined as a CAFO.

**Exhibit 15. Threshold Number of Animals (by Animal Type) to Meet the Definition of a CAFO with More Than 1,000 AUs**

Animal Type	Number of Animals Units
Beef cattle	1,000 slaughter or feeder cattle
Dairy cattle	700 mature dairy cattle (whether milked or dry)
Swine	2,500 swine (over 25 kilos - approximately 55 lbs.)
Sheep	10,000 sheep or lambs
Horses	500 horses
Chickens	100,000 laying hens or broilers when the facility (if continuous flow watering system); 30,000 laying hens or broilers (if liquid manure system)
Turkeys	55,000 turkeys
Ducks	5,000 ducks

Source: 40 CFR Part 122, Appendix B (a)

- ***AFOs With 301 to 1,000 AUs May Be CAFOs.*** AFOs with 301 to 1,000 AUs are defined as CAFOs only if, in addition to the number of animals confined, they also meet one of the specific criteria governing “method of discharge.” If the number of AUs for any one animal type exceeds the specified number [40 CFR Part 122, Appendix B(b)], or if the *cumulative* number of animal types exceeds 300 AUs, **and** only one of the “method of discharge” criteria are met, the facility is defined as a CAFO.

- **AFOs with up to 300 AUs.** An AFO with up to 300 AUs may be considered a CAFO only if designated as such by the permitting authority and if it meets the discharge criteria (see below).

***AFOs Designated as CAFOs***

According to the NPDES permit regulations [40 CFR 122.23 (c)], the NPDES-authorized permitting authority can, on a case-by-case basis, designate any AFO as a CAFO after determining that it is a significant contributor of pollution to waters of the United States. No AFO with fewer than 300 AUs shall be designated a CAFO unless it also meets the discharge criteria outlined in 40 CFR 122.23(c).

An AFO *cannot* be designated a CAFO on a case-by-case basis until the an inspector has conducted an on-site inspection of the facility and determined that the facility is a significant contributor of pollution. The designation is based on the factors listed in 40 CFR 122.23 (c) and shown below. This determination may be based on visual observations as well as water quality monitoring. Exhibit 16 shows example case-by-case designation factors and the inspection focus related to each factor.

<b>Exhibit 16. Example Factors for Case-by-Case CAFO Designation</b>	
<b>Designation Factor</b>	<b>Inspection Focus</b>
Size of the operation and amount of waste reaching waters of the United States	<ul style="list-style-type: none"> <li>• Number of animals</li> <li>• Type of feedlot surface</li> <li>• Feedlot design capacity</li> <li>• Waste handling/storage system design capacity</li> </ul>
Location of the operation relative to waters of the United States	<ul style="list-style-type: none"> <li>• Location of water bodies</li> <li>• Location of flood plain</li> <li>• Proximity to surface waters</li> <li>• Depth to groundwater, direct hydrologic connection to surface water</li> </ul>
Means of conveyance of animal waste and process waste waters into waters of the United States	<ul style="list-style-type: none"> <li>• Identify existing or potential man-made (includes natural and artificial materials) structures that may convey waste</li> <li>• Direct contact between animals and surface water</li> </ul>
Slope, vegetation, rainfall and other factors affecting the likelihood or frequency of discharge	<ul style="list-style-type: none"> <li>• Slope of feedlot and surrounding land</li> <li>• Type of feedlot (concrete, soil, etc.)</li> <li>• Climate (e.g., arid or wet)</li> <li>• Type and condition of soils</li> <li>• Depth to groundwater</li> <li>• Drainage controls</li> <li>• Storage structures</li> <li>• Amount of rainfall</li> <li>• Volume and quantity of runoff</li> <li>• Buffers</li> </ul>
Other Relevant Factors	<ul style="list-style-type: none"> <li>• Waste handling and storage</li> <li>• Land application timing, methods, rates and areas</li> </ul>

Following the on-site inspection, the NPDES permitting authority will prepare a brief report that: (1) identifies findings and any follow-up actions; (2) determines whether or not the facility should be designated as a CAFO; and (3) documents the reasons for that determination. Regardless of the outcome, a letter would be prepared and sent to the facility. The letter should inform the facility that it has been either: (1) designated a CAFO and required to apply for an NPDES permit; or (2) has not been designated as a CAFO at this time. In those cases where a facility has not been designated as a CAFO but the NPDES authority has identified areas of concern, these would be noted in the letter.

## II.D. Geographic Distribution and Economic Trends

As described in the executive summary of the *Preliminary Data Summary: Feedlots Point Source Category Study* (December 1998), livestock production operations in the U.S. vary widely in both the mode and scale of production, with individual farms spanning small scale production facilities with few animals to large, intensive production facilities. The following are summaries of the principal producing States in 1992 by animal commodity for beef cattle, swine, dairy cattle, and poultry.

- Ranked by the number of cattle and calves sold, the top ten producing states controlled 65 percent of U.S. beef production in 1992. Texas was the largest beef producing state accounting for 16 percent of 1992 sales. Other major states included Kansas, Nebraska, Oklahoma, Colorado, Iowa, California, South Dakota, Missouri, Wisconsin, and Montana.
- The hog farming sector is concentrated among the top five producing states that together supply about 60 percent of U.S. pork production. Iowa accounted for 24 percent of 1992 hog sales. Other major hog producing states included North Carolina, Illinois, Minnesota, Indiana, and Nebraska.
- The top five dairy cattle states controlled more than 50 percent of all U.S. milk production in 1992. Wisconsin was the largest dairy producing state with 16 percent of volume milk sales. Other major milk producing states included California, New York, Pennsylvania, and Minnesota.
- Broiler and chicken meat production is controlled by 10 producing states, which supply about 80 percent of all broilers sold. Arkansas was the largest broiler producer in 1992, with 16 percent of sales. Other major states included Georgia, Alabama, North Carolina, Mississippi, Texas, Maryland, California, Delaware, and Virginia.
- The top ten producing states accounted for about 80 percent of turkey production. North Carolina was the largest turkey producing state in 1992, with about 20 percent of sales. Other top producing states included Minnesota, California, Arkansas, Virginia, Missouri, Indiana, Texas, Iowa, and Pennsylvania.
- Egg production is dominated by 10 producing states that supply almost two-thirds of the eggs sold. California was the largest egg producing state in 1992 with about 12 percent of all eggs sales. Other major producers included Indiana, Pennsylvania, Georgia, Ohio, Arkansas, Texas, North Carolina, and Alabama.

Recent trends in the U.S. livestock sector are marked by a decline in the number of farms attributable to ongoing consolidation in the livestock industry. Farms are closing – especially small farming operations – due to competitive pressures from highly specialized – often lower cost – large scale producers. This trend toward fewer and larger livestock operations represents a significant shift in the industry. Both 1992 and 1997 Agriculture Census data highlight the ongoing shift from many small, diversified farms toward fewer large-scale, year-round, intensive breeding and feeding operations.

Another industry trend has been a steady increase in animal production and sales in the U.S. This trend has occurred at the same time there has been a decrease in the number of animals on site. This trend signals continued gains in production efficiency on U.S. farms in the form of higher per-animal yields and quicker turnover of animals prior to marketing.

A detailed industry economic profile is presented in the *Feedlots Point Source Category Study* and covers major commodity sectors, industry trends in the U.S. livestock and poultry farm sectors, recent market trends, farm revenue, farm-gate prices, financial operating conditions, industry marketing chain, and industry employment generated.

Additional geographic and economic information can be found by accessing the 1997 Agriculture Census at <http://www.nass.usda.gov/census/> and the National Agriculture Statistics Service at <http://www.usda.gov/nass/>.

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